16.3500

S/140/60/000/004/006/006
C111/C333

AUTHORS: Eydel'man, S.D., Porper, F.O.

16

TITLE: On the Stabilization of the Solutions of Cauchy's Problem for Parabolic Systems

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Matematika, 1960, No. 4, pp. 210-217

TEXT: The authors consider the system of differential equations

(1) $$\frac{\partial u}{\partial t} = P(t, \frac{1}{i} D)u$$

with continuous coefficients for $t \geq 0$. Let the system be parabolic in every strip $0 \leq t \leq T$. Let $u(x,t)$ be the solution of the Cauchy problem for (1) which corresponds to a bounded initial vector function $\varphi(x)$ and which belongs to the class of uniqueness E (notations see (Ref. 8)). The authors give conditions for (1) and $\varphi(x)$ which are sufficient such that $u(x,t) \to l$ for $t \to \infty$ uniformly in every finite parallelepiped of the space $x_1, x_2, \ldots, x_n$, where l is a certain constant occurring in the conditions. The investigations of the Green matrix by Eydel'man (Ref. 8) are essentially used. The given conditions refer to the case, where the trivial solution

Card 1/2

83214
S/140/60/000/004/006/006
C111/C333

On the Stabilization of the Solutions of Cauchy's Problem for Parabolic Systems

of (1) is stable according to Lyapunov. If it is not stable, then a stabilization of the solution is possible only for special initial functions corresponding to the system.

The authors mention: A.M. Il'in, O.A. Oleynik, I.G. Petrovskiy and A.G. Kostyuchenko.

There are 8 references: 6 Soviet and 2 Polish.

ASSOCIATION: Chernovitskiy gosudarstvennyy universitet (Chernovitsy State University)

SUBMITTED: October 14, 1958

Card 2/2

81714

S/020/60/133/01/10/069
C 111/ C 333

AUTHOR: Eydel'man, S. D.

TITLE: On a Class of Parabolic Systems

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 1, pp. 40-43

TEXT: The author defines parabolic systems (so-called 2b-parabolic systems, $2b = (2b_1, 2b_2, \ldots, 2b_n)$) for which the derivatives with respect to every spatial coordinate possess their own highest order; if these orders coincide for all coordinates, then the 2b-parabolic systems transform into systems which are parabolic in the sense of J. G. Petrovskiy (Ref. 1). For these new introduced systems the author constructs fundamental matrices of solutions and proves with their aid the correct solubility of the Cauchy problem. The investigation is carried out by the same method (Ref. 3) with which the author already investigated the systems parabolic in the sense of J. G. Petrovskiy. He gives four theorems which are partially very long.
There are 5 Soviet references.

ASSOCIATION: Chernovitskiy gosudarstvennyy universitet (Chernovitsy State University)

PRESENTED: March 3, 1960, by J. N. Vekua, Academician

SUBMITTED: March 5, 1960

Card 1/1

89525

S/039/61/053/001/001/001
C111/C222

16.3500
AUTHOR: Eydel'man, S.D. (Chernovtsy)

TITLE: On fundamental solutions of parabolic systems.II

PERIODICAL: Matematicheskiy sbornik, vol.53, no.1, 1961, 73-136

TEXT: The present paper is a continuation of the author's preceding papers (Ref.7: O fundamental'nykh resheniyakh parabolicheskikh sistem [On fundamental solutions of parabolic systems] Matem.sb.38(80) (1956), 51-92. Ref.8: Liuvillevy teoremy i teoremy ob ustoychivosti dlya resheniya parabolicheskikh sistem [Liouville's theorems and theorems on the stability for the solution of parabolic systems] Matem.sb. 44 (86) (1958), 481-508). It contains a detailed description of results on the construction of the fundamental matrices of the solutions of arbitrary systems parabolic according to I.G.Petrovskiy obtained in the author's dissertation (Ref.10: Issledovaniye po teorii paraboli-cheskikh sistem [Investigations of the theory of parabolic systems] Avtoreferat dissertatsii, MGU, 1958) and partially announced in (Ref.9: Fundamental'nyye matritsy resheniy obshchikh parabolicheskikh sistem [Fundamental matrices of the solutions of general parabolic systems] DAN SSSR, vol.120,no.5 (1958), 980-983) as well as the application of

Card 1/11

these results to the investigation of the correct solvability of the Cauchy problem in the classes of quickly increasing functions for systems being little different from linear ones. The author considers also the solvability of the Cauchy problem for quasilinear parabolic systems. He uses notations and definitions of (Ref.7-9).
Chapter I. Fundamental solution matrices of general parabolic systems. The author considers the system

$$\frac{\partial^{n_i} u_i}{\partial t^{n_i}} \sum_{j=1}^{N} \sum_{2bk_o+|k|\le 2bn_j} A_{ij}^{(k_o k)}(t) \frac{\partial^{k_o}}{\partial t^{k_o}} D_x^k u_j \quad (i=1,2,\ldots,N) \qquad (1.1)$$

parabolic according to I.G.Petrovskiy, and the dual system

$$\frac{d^{n_i} v_i}{dt^{n_i}} = \sum_{j=1}^{N} \sum_{2bk_o+|k|\le 2bn_j} A_{ij}^{(k_o k)}(t)(is)^k \frac{d^{k_o} v_j}{dt^{k_o}} . \qquad (1.2)$$

The matrix $V(t,\tau,s) = \| v_j^{(l)}(t,\tau,s) \|_{j,l=1}^{N}$, $s=\sigma+i\gamma$, each column of

On fundamental solutions...

which satisfies (1.2) and the initial conditions

$$\left.\frac{d^{k_o}}{dt^{k_o}} v_j^{(1)}\right|_{t=\tau} = \delta_{jl}\,\delta_{k_o n_l - 1} \quad (k_o=0,1,\ldots,n_j-1;\ j=1,2,\ldots,N) \qquad (1.3)$$

is called the Green's matrix of (1.2). The green's matrix $\|G_j^{(1)}(t,\tau,x)\|$ of (1.1) is the Fourier transform of $\|v_j^{(1)}(t,\tau,\sigma)\|$:

$$G_j^{(1)}(t,\tau,x) = (2\pi)^{-n}\int e^{i(\sigma,x)}\, v_j^{(1)}(t,\tau,\sigma)\,d\sigma\,. \qquad (1.12)$$

The matrix $\|G_j^{(1)}(t,\tau,z)\|$, $z=x+iv$ of (1.1) (considered as a function of the arguments $\frac{z_1}{(t-\tau)^{1/2b}},\ldots,\frac{z_n}{(t-\tau)^{1/2b}}$) is an entire function of the order of growth $q=\frac{2b}{2b-1}$ for complex values of the argument and the same order of decrease for real values of the argument. The estimations

Card 3/ 11

On fundamental solutions...

$$\left|\frac{\partial^{k_0}}{\partial t^{k_0}} D_x^k G^{(l)}(t,\tau,x+iv)\right| \leqslant$$

$$\leqslant C_k (t-\tau)^{-\frac{n+|k|}{2b}+n_j-k_0-1} \exp\left\{\left(-c\sum_{l=1}^{n}|x_l|^q + F\sum_{l=1}^{n}|v_l|^q\right)(t-\tau)^{-\frac{1}{2b-1}}\right\}. \quad (1.13)$$

are valid for the derivatives. These estimations permit to construct the fundamental solution matrices for arbitrary linear parabolic systems (1.1) according to classical methods. Here an estimation analogous to (1.13) is valid; that is reached by estimating the iterated kernels of the integral equation the solution of which is in connection with the determination of the fundamental solution matrix. At first the fundamental solution matrix for

$$\frac{\partial^{n_i} u_i}{\partial t^{n_i}} = P_{oi}(t,x;\frac{1}{i}\frac{\partial}{\partial x},\frac{\partial}{\partial t})u + P_{1i}(t,x;\frac{1}{i}\frac{\partial}{\partial x},\frac{\partial}{\partial t})u \equiv P_i(t,x;\frac{1}{i}\frac{\partial}{\partial x},\frac{\partial}{\partial t})u \quad (3.1)$$

Card 4/ 11

On fundamental solutions...

is constructed under the assumption that the coefficients are given in $\Pi_1\{-\infty < x_s < \infty\ ,\ s=1,2,\ldots,n,\ \ 0 \leq t \leq T\}$.

Theorem 1: 1) Let the coefficients of $P_i(t,x;\frac{1}{i}\frac{\partial}{\partial x},\frac{\partial}{\partial t})$ be continuous in t; let the coefficients of $P_{oi}(t,x;\frac{1}{i}\frac{\partial}{\partial x},\frac{\partial}{\partial t})$ be continuous in t uniformly with respect to $x_1,\ldots,x_n$ from Π_1. 2) Let the coefficients of P_i be bounded and satisfy the Hölder condition in $x_1,\ldots,x_n$ with the exponent α, $0 < \alpha \leq 1$.
Then (3.1) has a fundamental solution matrix $Z_i^{(1)}(t,\tau,x,\xi)$, $t > \tau$, which satisfies

$$\left|\frac{\partial^{k_0}}{\partial t^{k_0}} D_x^k Z_i^{(1)}(t,\tau,x,\xi)\right| \leqslant C_{k,k}(t-\tau)^{-\frac{n+|k|+2b(k_0-n_i+1)}{2b}} \exp\{-cp\}, \quad (3.2)$$

$$2bk_0 + \sum k_s \leqslant 2bn_i.$$

Card 5/11

On fundamental solutions...

$$\left|\frac{\partial^{k_0}}{\partial t^{k_0}} D_x^k (Z_i^{(l)}(t,\tau,x+h,\xi) - Z_i^{(l)}(t,\tau,x,\xi))\right| \leqslant$$

$$\leqslant C^*_{k_0 k} |h|^\gamma (t-\tau)^{-\frac{n+|k|+2b(k_0-n_i+1)+\gamma}{2b}} \exp(-c^* p), \qquad (3.3)$$

$$\frac{|h|}{(t-\tau)^{\frac{1}{2b}}} < a; \qquad (3.4)$$

$a > 0$ -- arbitrary number; $C_{k_0 k}$, c -- positive constants depending only on T; $C^*_{k_0 k}$, c^* -- positive constants depending only on T and a; $\gamma = \alpha$ if $2bk_0 + \sum k_s < 2bn_i$ and $\gamma < \alpha$ arbitrarily positive if $2bk_0 + \sum k_s = 2bn_i$. Then it is shown how to construct under certain assumptions the fundamental solution matrix for systems with increasing coefficients in Π_1.

Chapter 2. Cauchy problem. At first the author introduces some spaces.

Card 6/11

89525
S/039/61/053/001/001/001
C111/C222

On fundamental solutions...

$u(x,t) \in L_{p,k(t)}$, $1 \leq p < \infty$, if the p-th power of the function $|u(x,t)| \exp\left\{-k(t) \sum_{s=1}^{n} |x_s|^q\right\}$ is summable. $L_{p,k(t),s}$ is the space of the vector functions the components of which belong to $L_{p,k(t)}$.

$M_{p,[t_o,t_i],s}$ -- Banach space of the vector functions $u(x,t) \in L_{p,k(t),s}$ with the property that $u(x,t)e^{-k(t)\sum_{s=1}^{n} |x_s|^q}$ is Bochner-integrable with respect to t:

$$\|u(x,t)\|_{M_{p,[t_o,t_1],s}} = \int_{t_o}^{t_1} \|u(x,t)\|_{L_{p,k(t),s}} dt,$$

where

$$\|u(x,t)\|_{L_{p,k(t)}} = \left[\int |u(x,t)|^p \exp\left\{-pk(t) \sum_{s=1}^{n} |x_s|^q\right\} dx\right]^{\frac{1}{p}}, \quad q = \frac{2b}{2b-1},$$

$$\|u(x,t)\|_{L_{p,k(t),s}} = \left[\int \left(\sum_{k=1}^{s} |u_k|^2\right)^{\frac{p}{2}} \exp\left\{-pk(t) \sum_{s=1}^{n} |x_s|^q\right\} dx\right]^{\frac{1}{p}}, u=(u_1,\ldots,u_s)$$

Card 7/11

On fundamental solutions...

Then the author considers the problem

$$\frac{\partial^{n_i} u_i}{\partial t^{n_i}} = P_i\left(t,x;\ \frac{1}{i}D,\ \frac{\partial}{\partial t}\right)u + F_i\left(t,u,\ldots,\frac{\partial^{k_0}}{\partial t^{k_0}}D_x^k u_j,\ldots\right) \qquad (4.9)$$

$$(i=1,2,\ldots,N),$$

where $2bk_0+|k| \leq m_j \leq 2bn_j-1$, and $F(t,v)$ is an operator defined in $M_{p,[t_0,t_1],N}$ with values in the same space, with the initial condition

$$\lim_{t\to+t_0}\left\|\frac{\partial^{k_0}u_j}{\partial t^{k_0}}\right\|_{L_{p,h(t)}} = 0, \quad \lim_{t\to+t_0}\left\|\frac{\partial^{n_l-1}u_l(x,t)}{\partial t^{n_l-1}} - \varphi_l(x)\right\|_{L_{p,h(t)}} = 0 \qquad (4.10)$$

$$(k_0 = 0, 1, 2, \ldots, n_l-2),$$

$$\varphi(x) \in L_{p,h(t_0),N} = L_{p,h,N}.$$

The author gives (theorem 2) conditions for the existence of a unique

Card 8/11

generalized solution in $M_{p,[t_0,t_1],N}$ which depends continuously on the initial values and on $F(\tau,0)$; furthermore for the existence of a classical solution which belongs to $M_{p,[t_0,t_1],N}$ together with the derivatives up to the order $k_0+|k|$, $2bk_0+|k| \leq 2bn_i-1$.

Theorem 3 states that the problem (4.9),(4.10) under certain assumptions has at most one regular solution which belongs to $M_{p,[t_0,t_1],N}$ together with all derivatives of the order $k_0+k_1+\ldots+k_n$ with respect to $t,x_1,..,x_n$.

Theorem 3' contains the analogous assertion for the Cauchy problem (4.10) for the system (3.1).

Finally the author considers quasilinear systems:

$$\frac{\partial^{n_i} u_i}{\partial t^{n_i}} = F(t,x,u_j,\ldots, \frac{\partial^{k_o}}{\partial t^{k_o}} D_x^k u_j,\ldots), \qquad (5.1)$$

On fundamental solutions...

$$\left.\frac{\partial^{k_o} u_i}{\partial t^{k_o}}\right|_{t=+t_o} = \varphi_i^{(k_o)}(x) \qquad (5.2)$$

and the real case

$$\frac{\partial u}{\partial t} = \sum_{i,j=1}^{n} a_{ij}(x,t) E \frac{\partial^2 u}{\partial x_i \partial x_j} + F(t,x,u,p_1,\ldots,p_n), \quad p_s = \frac{\partial u}{\partial x_s}, \qquad (5.25)$$

$$u|_{t=+o} = \varphi(x). \qquad (5.26)$$

The theorem 4 of existence and uniqueness of the solutions of (5.1)-(5.2) is formulated without proof. The theorem is contained in the author's paper (Ref.21: O nekotorykh primeneniyakh fundamental'nykh matrits resheniy parabolicheskikh sistem [On some applications of the fundamental solution matrices of parabolic systems], Teor.i prikl. matem., L'vov, 1 (1958), 99-149).

Card 10/11

89525

S/039/61/053/001/001/001
C111/C222

On fundamental solutions...

Theorem 5 gives conditions under which the problem (5.25),(5.26), where $\varphi(x)$ is bounded together with the first derivatives, has a unique bounded solution $u(x,t) \in C^3$.

The author mentions I.M.Gel'fand, G.Ye.Shilov, O.A.Oleynik, T.D.Ventsel', O.A.Ladyzhenskaya, S.G.Kreyn, M.A.Krasnosel'skiy, L.N.Slobodetskiy and Ya.I.Zhitomirskiy. He thanks S.G.Kreyn and Ya.B.Lopatinskiy for discussions. There are 19 Soviet-bloc and 2 non-Soviet-bloc references. The reference to the English-language publication reads as follows: E.Hill, Funktsional'nyy analiz i polugruppy, [Functional analysis and semigroups] Moscow, IIL, 1951.

SUBMITTED: April 9, 1959

Card 11/11

S/020/61/136/002/007/034
C 111/ C 333

16 3500

AUTHORS: Eydel'man, S. D., Ivasishen, S. D.

TITLE: Cauchy Problem for a Class of Nonlinear Parabolic Systems

PERIODICAL: Doklady Akademii nauk SSSR, 1961, Vol. 136, No. 2, pp. 304-307

TEXT: The authors consider the system

$$(1)\quad \frac{\partial^{n_i} u_i}{\partial t^{n_i}} = F_i\left(t, x, u_1, \ldots, u_N, \ldots, \frac{\partial^{k_o}}{\partial t^{k_o}} D^k u_j, \ldots\right) \qquad (i = 1,2,\ldots,N)$$

where $D^k = \dfrac{\partial^{|k|}}{\partial x_1^{k_1} \ldots \partial x_n^{k_n}}$, $|k| = k_1 + \ldots + k_n$;

$\tilde{k} = \dfrac{k_1}{2b_1} + \ldots + \dfrac{k_n}{2b_n}$; $k_o + \tilde{k} \leqq n_j$; $\vec{2b} = (2b_1, \ldots, 2b_n)$;

$b_1 \geq b_2 \geq \ldots \geqslant b_n$; $\sigma^k = \sigma_1^{k_1} \sigma_2^{k_2} \ldots \sigma_n^{k_n}$; $x = (x_1, \ldots, x_n)$;

Card 1/8

S/020/61/136/002/007/034
C 111/ C 333

Cauchy Problem for a Class of Nonlinear Parabolic Systems

$\Delta = 0$ for integer $\frac{b_1}{b_n}$, $\Delta = 1$ for fractional $\frac{b_1}{b_n}$.

Definition: (1) is called $2\vec{b}$-parabolic in $\prod_{1}^{n}\{t_o \leqq t \leqq T, -\infty < x_s < \infty, s = 1,2,\ldots, n;$

$$\left| \frac{\partial^{k_o}}{\partial t^{k_o}} D^{k} u_j \right| \leqq M, \; j = 1,2,\ldots, N, \; k_o + \tilde{k} \leqq n_j \Big\}$$

if the roots of the equation

$$D(\lambda, \sigma) = \det \left\{ \left\| \sum_{k_o + \tilde{k} = n_j} \frac{\partial F_i}{\partial \left[\frac{\partial^{k_o}}{\partial t^{k_o}} D^{k} u_j \right]} (i\sigma)^{k} \lambda^{k_o} \right\| - \left\| \lambda^{n_1} \; \ldots \; \lambda^{n_N} \right\| \right\} = 0$$

satisfy the inequality $\operatorname{Re} \lambda \leq -\delta$ for $\left(t, x, \frac{\partial^{k_o}}{\partial t^{k_o}} D^{k} u_i\right)$ and all real $\sigma_1, \ldots, \sigma_n$, where $\sigma_1^{2b_1} + \sigma_2^{2b_2} + \ldots + \sigma_n^{2b_n} = 1$.

Card 2/8

S/020/61/136/002/007/034
C 111/ C 333

Cauchy Problem for a Class of Nonlinear Parabolic Systems

The authors consider the Cauchy problem

$$(2) \qquad \frac{\partial^{k_o}}{\partial t^{k_o}} u_i \Big|_{t=+t_o} = \varphi_i^{(k_o)}(x) \quad (k_o = 0,1,\ldots, n_i - 1;\ i=1,2,..,N)$$

for (1).

For simplicity assume that $n_1 = n_2 = \ldots = n_N = 1$.

Theorem 1: Let $F_i(t,x,y_1,\ldots, y_\nu)$ in $\overline{\Pi}_1$ be continuous in t and possess continuous bounded derivatives in $\overline{\Pi}_1$ with respect to $x_1, y_1,\ldots, y_\nu$ up to the order

$$r_1 = 2b_1 + 2\left[\frac{b_1}{b_n}\right] + 1 + \Delta$$

which satisfy in $\overline{\Pi}_1$ the Lipschitz condition in $y_1, y_2,\ldots, y_\nu$ (the derivatives of

$$\frac{\partial F_i}{\partial [D^{\tilde{k}} u_j]}, \quad \tilde{k} = 1$$

Card 3/8

89604

S/020/61/136/002/007/034
C 111/ C 333

Cauchy Problem for a Class of Nonlinear Parabolic Systems

are to satisfy the Lipschitz condition in $y_1, y_2, \ldots, y_\nu$ and x); where the continuity of the

$$\frac{\partial F_i}{\partial \left[D^k u_j \right]}, \quad \tilde{k} = 1$$

is assumed to be uniform in t with respect to $x, y_1 \ldots, y_\nu$ in $\overline{\Pi}_1$; let the $\varphi_i(x)$ have continuous bounded derivatives of the order

$$|k| + \left[\frac{b_1}{b_n} \right] + 1, \quad \tilde{k} \leq 2 + \frac{1}{2b_n} .$$

For $t_o < t \leq t_o + \eta$, $\eta > 0$, then there exists a solution $u_i(x,t)$ of (1) - (2) which possesses continuous bounded derivatives with respect to x up to the order

$$|k| + \left[\frac{b_1}{b_n} \right] + 2, \quad \tilde{k} \leq 2 - \frac{1}{b_1} .$$

This solutions is unique in the class of the functions which possess

Card 4/ 8

Cauchy Problem for a Class of Nonlinear Parabolic Systems

bounded and continuous derivatives with respect to x in the sense of Hölder up to the order

$$|k| + \left[\frac{b_1}{b_n}\right] + 1, \quad \tilde{k} \leq 2 - \frac{1}{b_1} .$$

The solution obtained depends continuously on the initial data: let $\tilde{u}_i(x,t)$, $\tilde{\tilde{u}}_i(x,t)$ be solutions of (1) which correspond to $\tilde{\varphi}_i(x)$, $\tilde{\tilde{\varphi}}_i(x)$, let

$$\sum_{i=1}^{N} \sum_{\tilde{k}<1,\ |s| \leq \left[\frac{b_1}{b_N}\right]+1} \left| D^{k+s}\left[\tilde{\varphi}_i(x) - \tilde{\tilde{\varphi}}_i(x)\right] \right| < \varepsilon$$

then it holds $|\tilde{u}_i(x,t) - \tilde{\tilde{u}}_i(x,t)| \leq M_1 \varepsilon$, where M_1 on M, T δ (δ from the parabolicity condition) and on the constants bounding F_i and their derivatives. If, however,

$$r_1 = 2b_1 + 2\left[\frac{b_1}{b_N}\right] + 1 + \Delta + S_1$$

Card 5/8

Cauchy Problem for a Class of Nonlinear Parabolic Systems

then every solution which has bounded and Hölder-continuous derivatives with respect to x up to the order

$$|k| + \left[\frac{b_1}{b_n}\right] + 1, \ \tilde{k} \leqq 2 - \frac{1}{b_1}$$

possesses continuous bounded derivatives of the order

$$|k| + \left[\frac{b_1}{b_n}\right] + 1, \ \tilde{k} \leqq 2 + \frac{1}{2b_n} + \frac{s}{2b_1} \quad \text{for } t > t_o.$$

The proof of the theorem is carried out by reducing the problem to an equivalent Cauchy problem for the special quasilinear parabolic system

$$(3) \quad \frac{\partial u_i}{\partial t} = \sum_{j=1}^{N_1} \sum_{\tilde{m}=1} A_{ij}^{(m)}(t,x,u_1,\ldots,u_{N_1},\ldots,D^k u_j,\ldots) D^m u_j +$$

$$+ F_{1i}(t,x,u_1,\ldots,u_{N_1},\ldots,D^{k'}u_j,\ldots), \ i = 1,2,\ldots,N_1,$$

Card 6/8

S/020/61/136/002/007/034
C 111/ C 333

Cauchy Problem for a Class of Nonlinear Parabolic Systems

where $k \leq \frac{1}{2b_n}$, $1 < 2b_n - 1$, $\tilde{k}' < 1$, with the initial conditions

(4) $u_i|_{t=+t_o} = \varphi_i(x)$, $i = 1,2,\ldots, N_1$.

For the problem (3) - (4) the authors formulate theorem 2 corresponding to theorem 1, which can be proved by successive approximation with the aid of the fundamental matrices of the solutions.

The highly restrictive assumptions of the theorems 1 and 2 can be moderated for so-called strongly parabolic systems:

Definition: System (1) with $u_1 = u_2 = \ldots u_N = 1$ is called strongly parabolic in Π_1, if for $(t,x,D^k u) \in \Pi_1$, arbitrary real $\sigma_1, \sigma_2, \ldots \sigma_n$ and every complex-valued vector $\vec{a} = (a_1, a_2, \ldots, a_n)$ it holds

$$\mathrm{Re}\left\{ \sum_{i,j=1}^{N} \sum_{\tilde{k}=1} \frac{\partial F_i}{\partial [D^k u_j]} (i\sigma)^k a_i a_j \right\} < -\delta |\vec{a}|^2 (\sigma_1^{2b_1} + \ldots + \sigma_n^{2b_n}).$$

In the case of a space coordinate it holds

Card 7/ 8

89604

S/020/61/136/002/007/034
C 111/ C 333

Cauchy Problem for a Class of Nonlinear Parabolic Systems

Theorem 3: If $F(t,x,y_1,\ldots, y_\nu)$ has 4 continuous bounded derivatives with respect to $x,y_1,\ldots, y_\nu$ which in Π_1 satisfy the Lipschitz condition relative to $y_1,\ldots, y_\nu$, and if $\varphi(x)$ possesses $2b + 4$ continuous bounded derivatives, then for $t_0 < t \leq t_0 + \eta$ there exists a $(2b+2)$-times differentiable solution of Cauchy's problem $u = \Big|_{t=+t_0} = \varphi(x)$ for the system (1).

M. A. Krasnosel'skiy, S. G. Kreyn and J. G. Petrovskiy are mentioned.

There are 3 Soviet references.

ASSOCIATION: Chernovitskiy gosudarstvennyy universitet (Chernovitsy State University)

PRESENTED: July 22, 1960, by J. G. Petrovskiy, Academician

SUBMITTED: July 5, 1960

Card 8/8

32457
S/044/61/000/010/021/051
C111/C222

16.3500

AUTHOR: Eydel'man, S.D.

TITLE: On some applications of the fundamental matrices of the solutions of parabolic systems

PERIODICAL: Referativnyy zhurnal. Matematika, no. 10, 1961, 50, abstract 10 B 217. ("Teor. i prikl. matem." vyp I. L'vov, L'vovsk. un-t, 1958, 99-149)

TEXT: The article is a continuation of the author's paper (R Zh Mat,1956, 8844) and treats the further investigation and application of the fundamental matrices of the solutions of linear parabolic systems

$$\frac{\partial u}{\partial t} = P\left(t,x\,;\ \frac{1}{i}\ \frac{\partial}{\partial x}\right) u\ .$$

The fundamental matrix of the solutions is constructed under the assumption that the coefficients are continuous in t (where the continuity in t of the coefficients of the principal part of the system is uniform with respect to $x_1,\ldots,\ x_n$) and satisfy the Hölder condition

Card 1/2

32457
S/044/61/000/010/021/051
C111/C222

On some applications of the ...

with the exponent α $(0 < \alpha \leq 1)$ with respect to the $x_1, \ldots, x_n$. Here the author gives corresponding estimations of the fundamental matrix of the solution, and their differential properties are investigated. With the aid of the fundamental matrix of the solutions the author investigates the behavior of the solutions of parabolic systems in the neighborhood of an isolated singular point, where the integral characteristic serves as the base of the investigation, i.e. the fundamental matrix of the solutions integrated with respect to the time ; that gives the possibility to obtain a pole and not an essential singular point as a singularity. The second part of the paper treats the investigation of the solvability of the Cauchy problem for non-linear systems being parabolic in the sense of I.G. Petrovskiy (the solvability means the solvability in the class of sufficiently smooth bounded functions). Here the problem is reduced to an equivalent Cauchy problem for a quasilinear parabolic system and this latter one is solved by successive approximations. For the special class of quasilinear systems the author gives a theorem on the correct solvability of the Cauchy problem in the class of quickly increasing functions.

[Abstracter's note : Complete translation.]

Card 2/2

EYDEL'MAN, S.D.; IVASISHEN, S.D.; PORPER, F.O.

Liouville theorems for parabolic systems in the sense of G.E.Shilov.
Izv. vys. ucheb. zav.; mat. no.6:169-179 '61. (MIRA 15:3)

1. Chernovitskiy gosudarstvennyy universitet.
(Differential equations, Partial) (Parabola)

EYDEL'MAN, S.D.

Application of the principle of averaging to quasilinear parabolic systems of the second order. Sib.mat.zhur. 3 no.2:302-207 Mr-Ap '62. (MIRA 15:4)
(Differential equations, Partial) (Average) (Statistics)

S/020/62/142/004/010/022
B112/B102

16.3500

AUTHOR: Eydel'man, S. D.

TITLE: Boundary value problem for parabolic systems in the semi-space

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 142, no. 4, 1962, 812-814

TEXT: The boundary value problem

$$\frac{\partial u}{\partial t} = \sum_{|k|=2b} A_k(-iD_x)^k u \equiv A(iD_x)u; \tag{1}$$

$$u|_{t=+0} = 0, \quad x_n > 0, \quad -\infty < x_s < \infty, \quad s = 1, 2, \ldots, n-1, \quad x' = (x_1, x_2, \ldots, x_{n-1}); \tag{2}$$

$$B_j\left(\frac{\partial}{\partial t}, iD_x\right)u\Big|_{x_n=+0} = \sum_{m=1}^{N} \sum_{2bl_s+|l|=r_j} B_{jm}^{(l,l)} \frac{\partial^{l_0}}{\partial t^{l_0}}(-iD_x)^l um|_{x_n=+0} = f_j(x', t), \tag{3}$$

(j = 1,2,...,bN, N is the number of equations of the system (1)) is solved by the functions

Card 1/3

oundary value problem for...

$$u_i(x,t) = \int_0^t d\tau \sum_{m=1}^{bN} G_{im}(t-\tau, x-\xi)f_m(\xi, \tau)d\xi,$$

where

$$G(t,x) = \frac{1}{(2\pi)^n i}\int e^{i(x',\sigma')}d\sigma' \int_{\gamma-i\infty}^{\gamma+i\infty} e^{pt}dp \int_{\Gamma_+} e^{ix_n\sigma_n}(A(\sigma)-pE)^{-1}(E, \sigma_n E, \ldots$$
$$\ldots, \sigma_n^{b-1}E)\,d\sigma_n \left[\int_{\Gamma_+} B(\sigma, p)\,(A(\sigma)-pE)^{-1}(E, \sigma_n E, \ldots, \sigma_n^{b-1}E)\,d\sigma_n\right]^{-1};$$
$$\gamma = -\delta_1|\sigma'|^{2b} + a_1; \qquad (6)$$

and

$$B(\sigma, p) = \left\| \sum_{2bl_s+|l'|=r_j} B_{jm}^{(l_s l')} p^{l_s} \sigma^{l'} \right\|_{\substack{j=1,2,\ldots,bN \\ m=1,2,\ldots,N}};$$

It is assumed that

$$\det \int_{\Gamma_+} B(\sigma,p)(A(\sigma) - pE)^{-1}(E, \sigma_n E, \ldots, \sigma_n^{b-1}E)d\sigma_n \neq 0.$$

Card 2/3

S/020/62/142/004/010/022
B112/B102

Boundary value problem for...

The analytic continuability of $G(t,x)$ for $t \geq 0$ is shown. Bounds for $\left|\left(\partial^{m_0}/\partial t^{m_0}\right)D_x^m G_{ij}(t,x)\right|$ and $\left|u_i(x,t)\right|$ are derived. I. G. Petrovskiy is mentioned. T. Ya. Zagorskiy (Ukr. matem. zhurn., 9, No. 3 (1957), DAN, 106, No. 1 (1956)) is referred to. There are 4 references: 3 Soviet and 1 non-Soviet.

ASSOCIATION: Chernovitskiy gosudarstvennyy universitet (Chernovtsy State University)

PRESENTED: September 22, 1961, by I. N. Vekua, Academician

SUBMITTED: September 19, 1961

Card 3/3

24.5200 16.3500

S/199/62/003/002/004/004
B125/B102

AUTHOR: Eydel'man, S. D.

TITLE: Application of the averaging principle to quasilinear parabolic systems of second order

PERIODICAL: Sibirskiy matematicheskiy zhurnal, v. 3, no. 2, 1962, 302-307

TEXT: The author proves N. N. Bogolyubov's theorem (O nekotorykh statisticheskikh metodakh v matematicheskoy fizike (Some statistical methods in mathematical physics), Izd. Ak. nauk USSR, Kiyev, 1945) for the solution of Cauchy's problem of a quasilinear parabolic system of second order

$$\frac{\partial u}{\partial t} = \sum_{i,j=1}^{n} A_{ij}(x) \frac{\partial^2 u}{\partial x_i \partial x_j} + \sum_{i=1}^{n} B_i(x) \frac{\partial u}{\partial x_i} + F(t, x, u, \lambda). \qquad (1)$$

with the nonnegative fundamental matrix

$$\frac{\partial u}{\partial t} = \sum_{i,j=1}^{n} A_{ij}(x) \frac{\partial^2 u}{\partial x_i \partial x_j} + \sum_{i=1}^{n} B_i(x) \frac{\partial u}{\partial x_i} \qquad (2).$$

Card 1/4

Application of the averaging ...

Theorem 1 which, according to I. I. Gikhman (Ukr. matem. zh., IV, No. 2 (1952), 215-219) follows immediately from a special theorem on the continuous parameter dependence of the solution of a differential equation, essentially expresses the following: The coefficients $A_{ij}(x)$, $B_i(x)$ are bounded and satisfy the Hölder condition. The uniformly bounded vector function $F(t,x,u,\lambda)$ which is continuous with respect to t, satisfies the Hölder condition with respect to $x_1, \ldots, x_n$ and the Lipschitz condition with respect to $u_1, u_2, \ldots, u_n$.

$$\lim_{\lambda \to \lambda_0} \int_0^t F(\tau, x, u, \lambda)\, d\tau = \int_0^t F(\tau, x, u, \lambda_0)\, d\tau$$

is uniform with respect to $x_1, \ldots, x_n$, $-\infty < x_s < \infty$, $0 < t \leqslant T$; the solution $v(x,t)$ of the system

$$\frac{\partial v}{\partial t} = \sum_{i,j=1}^{n} A_{ij}(x) \frac{\partial^2 v}{\partial x_i \partial x_j} + \sum_{i=1}^{n} B_i(x) \frac{\partial v}{\partial x_i} + F(t, x, v, \lambda_0), \qquad (4)$$

Card 2/4

with two derivatives which are continuous in the Hölder sense and bounded with respect to x, lies together with its ϱ-neighborhood in a bounded domain D of the space E_N. At the point λ_0, the solution u(x,t) of (1), which belongs to $C_{2,\alpha}$ and agrees with v(x,t) when t = 0, is continuous with respect to λ, i.e.

$$\max_{0<t<T} \| u(x,t) - v(x,t) \| = \max_{0<t<T} \sum_{j=1}^{N} \sup_{x} | u_j(x,t) - v_j(x,t) | \to 0 \qquad (5)$$

at $\lambda \to \lambda_0$. The theorem and the proof of M. A. Krasnosel'skiy and S. G. Kreyn (Trudy seminara po funktsional'nomu analizu. (Voronezhskiy universitet), no. 2 (1956), 3-23) are mentioned. If λ is sufficiently near λ_0, the solution $u(x,t) \equiv u(x,t,\lambda)$ may be defined on the whole interval $[0,T]$. Under the conditions assumed, the solution is defined in the semi-open interval $(0,t+\Delta)$. For the solution of the differential equations

$$\frac{\partial u}{\partial t} = \varepsilon \sum_{i,j=1}^{n} A_{ij}(x) \frac{\partial^2 u}{\partial x_i \partial x_j} + \varepsilon \sum_{i=1}^{n} B_i(x) \frac{\partial u}{\partial x_i} + \varepsilon F(t, x, u). \qquad (24),$$

Card 3/4

Application of the averaging ...

which belongs to $C_{2,a}$ and which is identical with $v(x,t)$ when $t = 0$, $0 < t < T/\varepsilon$ holds for any $\varepsilon (0 < \varepsilon < \varepsilon_0)$ if the condition $\|v(x,t) - u(x,t)\| < \eta$ is fulfilled. There are 6 references: 5 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: Aronson D. G., On the initial value problem for parabolic systems of differential equations, Bull. of the Amer. Math. Soc., 65, N 5 (1959), 310-318.

SUBMITTED: April 16, 1960

Card 4/4

EYDEL'MAN, S.D. (Chernovtsy)

Correction to the article "Fundamental solutions to parabolic systems. Part 2." Mat. sbor. 58 no.1:128 S '62. (MIRA 15:9)
(Differential equations)

S/021/63/000/001/004/012
D251/D308

AUTHORS: Matiychuk, M. I. and Eydel'man, S. D.

TITLE: Fundamental matrices of the solutions of parabolic systems of the second order with coefficients which satisfy the integral Hölder conditions

PERIODICAL: Akademiya nauk Ukrayins'koyi RSR. Dopovidi, no. 1, 1963, 17-21

TEXT: The authors consider a system of equations that is parabolic in the sense of I. H. Petrovs'kyy and a method of constructing the fundamental matrices of the solutions is given, on the assumption that the coefficients satisfy the integral Hölder conditions. Inequality conditions governing the fundamental matrices are established, and it is shown that the fundamental matrices may be used to solve the problem of the class of correctness of Cauchy's problem for second-order parabolic systems. From the theorems on correctness and the properties of fundamental matrices, a formula is deduced for the convolution. The English-language reference

Card 1/2

S/021/63/000/001/004/012
D251/D308

Fundamental matrices of ...

reads: D. G. Aronson, Bul. Amer. Mathem., v. 63, 310 (1959).

ASSOCIATION: Chernivets'kyy derzhavnyy universytet (Chernivtsi State University)

PRESENTED: by B. V. Hnyedenko, Academician

SUBMITTED: November 27, 1962

Card 2/2

L 18803-63 EWT(d)/FCC(w)/BDS AFFTC/IJP(C)

ACCESSION NR: AP3000280 S/0021/63/000/005/0575/0580

54
53

AUTHOR: Golets', B. I., Eydel'man, S. D.

TITLE: On some properties of linear systems with many space variables (presented by Yu O. My*tropol's'ky*y, member Ac. of Sci. UkrSSR)

SOURCE: AN UkSSR Dopovidi, no. 5, 1963, 575-580

TOPIC TAGS: parabolic system, fractional positive, variable coefficient, Cauchey theorem, evolutionary equation

ABSTRACT: The author describes characteristic solutions of systems of evolutionary type differential equations having many space coordinates satisfying essentially different conditions. Proof of three lemmas are used to postulate three theorems applicable to the solution of Cauchey's problem (when initial values are satisfied in a classical sense), for equations with variable coefficients and rapidly rising functions. The author concludes that his system is valid for equations having non-positive bounds. Orig. art. has: 10 series of equations.

ASSN: Chernivetz State University.

Card 1/1

EYDEL'MAN, S.D.

Theory of general boundary value problems for parabolic systems.
Dokl. AN SSSR 149 no.4:792-795 Ap '63. (MIRA 16:3)

1. Predstavleno akademikom I.N.Vekua.
(Boundary value problems) (Differential equations)

L 16964-63 EWT(d)/FCC(w)/BDS AFFTC/IJP(C)

S/020/63/149/006/004/027

54
53

AUTHOR: Eydel'man, S.D. and Ivasishen, S.D.

TITLE: Continuations of the solution to the Cauchy problem for parabolic systems 16

PERIODICAL: Akademiya nauk SSR. Doklady. vol. 149, no. 6, 1963, 1274-1277

TEXT: This article continues the study of the Cauchy problem for Petrovskiy-parabolic systems that was begun with S.D. Eydel'man's dissertation. In conjunction with Arcnson's new uniqueness theorems for the solution to the Cauchy problem for linear systems and certain consequences of interior estimates for solutions defined in a layer, more accurate estimates for a sequence of solutions to the Cauchy problem for linear systems that becomes, at the limit, the solution to a quasilinear system (nonlinear system) make it possible to prove very accurate theorems about the local solvability of the Cauchy problem for nonlinear parabolic systems. In turn, these theorems make it possible to prove new theorems about continuations of the solutions.

Card 1/2

L 16964-63

S/020/63/149/006/004/027

Continuations of the solution...

It is proved that relative to some very rigid norm, such a continuation is always possible. Along with such a norm, the author defines a natural norm that is directly related to the system of equations and discusses the possibility of continuing solutions relative to the natural norm. The nonlocal theorem follows easily from continuability of a solution relative to the natural norm, which is estimated a priori. The most important English-language references read as follows: D.G. Aronson, Bull. Am. Math. Soc., 65, 5, 310 (1959) and A. Friedman, J. Math. and Mech., 7, 3, 393 (1958).

ASSOCIATION: Chernovitskiy gosudarstvennyy universitet (Chernovitskiy State University)

SUBMITTED: November 13,1962

Card 2/2

L 12621-63 BDS/EWT(d)/FCC(w) AFFTC IJP(C)
ACCESSION NR: AP3000291 S/0020/63/150/001/0058/0061

53

AUTHOR: Eydel'man, S. D.; Lipko, B. Ya.

TITLE: Boundary-value problem for parabolic systems in the domain of shapes which are common to each other 16

SOURCE: AN SSSR. Doklady, v. 150, no. 1, 1963, 58-61

TOPIC TAGS: fundamental solution matrices

ABSTRACT: This work is a continuation of an earlier investigation by the author (DAN, 142, No. 4, 1962, and DAN, 149, no. 4, 1963) with the difference that the boundary-value problem for a parabolic system (in accordance with Petrovskiy's system) [Abst. note: Petrovskiy is not further identified] is studied in non-convex and non-cylindrical regions. It is shown here that, just as in the case of parabolic systems in convex regions, the differential problem can be reduced to an integral equation with the aid of special solution matrices. Orig. art. has: 12 formulas.

ASSOCIATION: Chernovitskiy gosudarstvennyy universitet (Chernovtsy State University)

Card 1/2

EYDEL'MAN, Samuil Davidovich; BITYUTSKOV, V.I., red.; KRYLIN, I.V., red.

[Parabolic systems] Parabolicheskie sistemy. Moskva, Izd-vo "Nauka," 1964. 443 p. (MIRA 17:7)

GOLETS, B.I. [Holets', B.I.]; EYDEL'MAN, S.D. [Lidel'man, S.D.]

Some properties of linear systems with many space coordinates.
Dop. AN URSR no.5:575-580 '63. (MIRA 17:9)

1. Chernovitskiy gosudarstvennyy universitet. Predstavlena akademikom AN Ukr:SSR Yu.A.Mitropol'skim [Mytropol's'kyi, IU.O.].

L 6123-65 EWT(d) IJP(c)

ACCESSION NR AM4047283 BOOK EXPLOITATION 9 S/ B+1

Eydel'man, Samuil Davidovich

Parabolic systems (Parabolicheskiye sistemy), Moscow, Izd-vo "Nauka", 1964, 443 p. illus., biblio.

TOPIC TAGS: mathematics, Cauchy problem, parabolic equation 16

TABLE OF CONTENTS (abridged):

Foreword — 5
Introduction — 7
Ch. I. Fundamental matrices of solutions of linear parabolic systems — 12
Ch. II. Some properties of solutions of parabolic systems — 175
Ch. III. Cauchy problem — 230
Ch. IV. Mixed problem for linear parabolic systems — 352
Supplements — 424
Bibliography — 438

SUBMITTED: 06Mar64 SUB CODE: MA

NO REF SOV: 040 OTHER: 016

ENCL: 1/1

L 13471-66 EWT(d)/EWP(1) IJP(c)

ACC NR: AP5028904 SOURCE CODE: UR/0020/65/165/003/0482/0485

33

B

AUTHORS: Matiychuk, M. I.; Eydel'man, S. D.

ORG: Voronezh Polytechnic Institute (Voronezhskiy politekhnicheskiy institut)

TITLE: Parabolic systems with coefficients satisfying a Dini condition

SOURCE: AN SSSR. Doklady, v. 165, no. 3, 1965, 482-485

TOPIC TAGS: differential equation, parabolic ~~equation~~ DIFFERENTIAL EQUATION, CAUCHY PROBLEM, LINEAR SYSTEM

ABSTRACT: Taking definitions and notation from a previous paper by S. D. Eydel'man (Parabolicheskiye sistemy, M., 1964), the authors consider

$$\frac{\partial u}{\partial t} = \sum_{|k|\leq 2b} A_k(t, x) D^k u + f(t, x), \qquad (1)$$

$$u|_{t=t_0} = \varphi(x). \qquad (2)$$

Results are given on correct solvability of the Cauchy problem and existence of fundamental solutions for linear parabolic systems whose modulus of continuity on the space coordinates of the coefficients satisfies a Dini condition. It is shown by examples that such an assumption of smoothness of the coefficients is the minimal one for validity of the results derived. This paper was presented by academician I. G. Petrovskiy on 12 April 1965. Orig. art. has: 8 formulas.

SUB CODE: 12/ SUBM DATE: 23Mar65/ SOV REF: 005/ OTH REF: 001

UDC: 517.966

Card 1/1 HW

MATIYCHUK, M.I.; EYDEL'MAN, S.D.

Parabolic systems with coefficients satisfying the Dini condition. Dokl. AN SSSR 165 no.3:482-485 N '65. (MIRA 18:11)

1. Voronezhskiy politekhnicheskiy institut. Submitted April 12, 1965.

L 44316-66 EWT(d) IJP(c)

ACC NR: AP6010421 SOURCE CODE: UR/0020/66/167/002/0298/0301

23
B

AUTHORS: Repnikov, V. D.; Eydel'man, S. D.

ORG: Voronezh Polytechnic Institute (Voronezhskiy politekhnicheskiy institut)

TITLE: Necessary and sufficient conditions for establishing a solution of the Cauchy problem 16

SOURCE: AN SSSR. Doklady, v. 167, no. 2, 1966, 298-301

TOPIC TAGS: Cauchy problem, Fourier integral, limit theorem, Poisson function

ABSTRACT: The necessary and sufficient conditions for establishing a solution of the Cauchy problem are investigated. Of interest is the question of when there exists a limit as $t \to \infty$ of the Cauchy problem solution

$$u|_{t=0} = u_0(x),$$

for the equation

$$\partial u / \partial t = (-1)^{b-1}\Delta^b u, \quad \Delta = \partial^2 / \partial x_1^2 + \ldots + \partial^2 / \partial x_n^2,$$

where $u_0(x)$ is a continuous bounded function defined by the Poisson integral

$$u(t, x) = \int G(t, x-\xi)\, u_0(\xi)\, d\xi.$$

It is proved that, for parabolic equations with constant coefficients whose fundamental solution level surfaces (along x_1, x_2, ..., x_n for a fixed time coordinate t)

Card 1/2 UDC: 517.946

L 44316-66

ACC NR: AP6010421

are well distributed and simply-defined, a necessary and sufficient condition for point stabilization of the solution to the Cauchy problem is the presence in the initial function of a limiting mean along bodies bounded by surfaces of the level of the fundamental solution. This result is established with the aid of the work by N. Weiner (The Fourier integral and some of its applications, M. 1963). In addition, equations with coefficients dependent on t are demonstrated, for which the same assertions apply. For general parabolic equations, certain properties of the mean from the initial function are studied under the assumption that the constructed solution of the Cauchy problem is established. This paper was presented by Academician I. G. Petrovskiy on 16 June 1965. Orig. art. has: 8 equations.

SUB CODE: 12/ SUBM DATE: 12Jun65/ ORIG REF: 003

Card 2/2 blg

EYTEL'MAN, S. Ya.

36055 Kompensatsionnyy metod izmereniya malykh peremeshcheniy v betone. Gidrotek i stroit-vo, 1949, N. 11, S. 1-

SO: Letopis' Zhurnal'nykh Statey, Vol. 45, 1949

KRAVTSOV, V.I., starshiy nauchnyy sotrudnik, kandidat tekhnicheskikh nauk;
EYDEL'MAN, S.Ya., inzhener.

Method for direct measurement of stresses in concrete. Izv. VNIIG no.39: 89-96 '49. (MLRA 10:3)

(Concrete--Testing) (Strain gauges)

EYDEL'MAN, S. YA.

USSR/Engineering - Construction, Materials — May 52

"Determining the Elasticity and Creep Characteristics of Concrete in Structures," S. Ya. Eydel'man, Cand Tech Sci

"Gidrotekh Stroit" No 5, pp 12-16

Discusses procedure of measuring deformations and calcg stresses in concrete. Analyzes phenomenon of creep in concrete and outlines method for detg creep characteristic. Discusses 2 methods for detg modulus of elasticity: impluse method and

230T12

method of testing specimen in structure. Describes hydraulic device which, when installed inside of concrete structure, permits obtaining elasticity and creep characteristics of concrete under tension or compression conditions.

230T12

EYDEL'MAN, S.Ya., kand. tekhn. nauk

Electrometric method for the measurement of moisture in concrete.
Izv. VNIIG 47:189-198 '52. (MIRA 12:6)
(Concrete) (Moisture--Measurement)

EYDEL'MAN, S.Ya., starshiy nauchnyy sotrudnik, kand.tekhn.nauk

Instruments for measuring deformations inside concrete. Izv. VNIIG 49:171-195 '53. (MIRA 12:5)
(Concrete--Measurement)

EYDEL'MAN, S. YA.

112-1-424

Translation from: Referativnyy Zhurnal, Elektrotekhnika, 1957, Nr 1, p. 68 (USSR)

AUTHOR: Eydel'man, S. Ya.

TITLE: Electroaccoustic Devices in the Installations of the Kakhovka Hydropower Development (Elektroakusticheskiye pribory v sooruzheniyakh Kakhovskogo gidrouzla)

PERIODICAL: Infor. byul. Dneprostroya, 1956, Nr 1, pp. 21-25

ABSTRACT: The structure, purpose and installation methods of devices placed in the concrete constructions of the Kakhovka development for the investigation of structural stresses, relations between the stresses in the concrete and the reinforcement, etc., are described. The work was done by the VNIIG (All-Union Scientific Research Institute of Hydraulic Engineering imeni B. Ye. Vedeneyev). Observations started in July 1953, and it was proposed to install a total of more than 1000 devices of the electro-accoustic (or string) type./ These can serve also as telethermometers (with an accuracy of 0.2 to 0.3°). Temperature conditions in several units after concreting were established with the help of these devices. The deficiencies of these devices, their sensitivity to humidity and the possibility of the string "sticking" to the magnet core, were noted. Drafts

Card 1/2

Electroaccoustic Devices in the Installations of the Kakhovka Hydropower Development (Cont.)

and detailed descriptions of the devices are given: (1) soil dynamometers for measuring soil stresses in structure foundations and the pressure of the soil fillings upon structure surfaces; (2) reinforcement dynamometers for measuring stresses in reinforcement rods of the reinforced concrete and sheathed structures; (3) "teletenzometers" (devices measuring deformation of loaded structures) for measuring local linear deformations of compression and expansion inside the concrete, and also some other types of devices.

Card 2/2

Yu. M. S.

EYDEL'MAN, S. YA.

124-11-13451

Translation from: Referativnyy Zhurnal, Mekhanika, 1957, Nr 11, p 160 (USSR)

AUTHOR: Eydel'man, S. Ya.
TITLE: Full-scale Investigation of the Inner Stresses in Concrete (Naturnoye issledovaniye sobstvennykh napryazheniy betona)
PERIODICAL: Izv. Vses - n.-i. in-ta gidrotekhn., 1956, 56, pp 71-81

ABSTRACT: The inner stresses were determined experimentally in 2x4x6-m blocks. A good correlation was established with the temperature curves set up by A. B. Belov's method (Izv. Vses. n.-i. in-tagidrotekhn., 47) with due consideration of the exothermy of the concrete.

The modulus of elasticity of the concrete, measured experimentally on a cylindrical block sample, was found to be significently smaller than the modulus established by laboratory tests; this is explained by the different setting and hardening conditions of the concrete. The calculated stresses at various points of the concrete, derived from the modulus of elasticity, were substantially higher than the measured values. The theoretical and experimental results were rendered consistent through the consideration of the phenomenon of stress relaxation.

(A.Ye Desov)

Card 1/1

SOV/112-58-2-1996

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1958, Nr 2, p 35 (USSR)

AUTHOR: Eydel'man, S. Ya.

TITLE: On the Problem of Measuring Stresses on the Surface of Actual Concrete Structures (K voprosu ob izmerenii napryazheniy na poverkhnosti ekspluatiruyemykh betonnykh sooruzheniy)

PERIODICAL: Izv. Vses. n.-i. in-ta gidrotekhn., 1957, Vol 57, pp 150-165

ABSTRACT: In 1949-1954, VNIIG experimentally checked a "method of local unloading" used to determine the stresses to which the surfaces of concrete hydraulic structures are subjected; the method is applicable under actual operating conditions when full unloading of the structures is impossible. The method involves disturbing the equilibrium state of stresses at a given surface structure point by drilling a hole or slit of a definite form, and subsequently measuring deformations set up by the hole. If the analytical expression of the effect of the hole on stress distribution around it is known, the stress acting at the point in question can be calculated from that analytical expression and the

Card 1/2

On the Problem of Measuring Stresses on the Surface of Actual Concrete . . . .

measured deformation. Stress computation methods for round holes and closed slits are considered, as well as a compensation method of calculation. Both theory and experimental data are presented and accuracy problems of different measuring instruments are mentioned. The closed-slit method is considered the simplest and most accurate. In the case of a small structure, the method of round-hole drilling can be used. The compensation methods are used where the surface stresses are known beforehand to be compressive. The accuracy of the local unloading method is $\pm$(15-20)%. There are 13 figures and 5 tables. Bibliography: 7 items.

Yu.M.S.

EYDEL'MAN, S.Ya., starshiy nauchnyy sotrudnik, kand.tekhn.nauk;
ALEKSANDROVSKAYA, E.K., inzh.

Some results of in situ observations on the temperature regimen and strained state of the concrete lock block of the Novosibirsk Hydroelectric Power Center. Izv.VNIIG 61: 144-158 '58. (MIRA 13:6)
(Concrete construction--Testing)
(Novosibirsk--Locks(Hydraulic engineering))

EYDEL'MAN, S.Ya., starshiy nauchnyy sotrudnik, kand.tekhn.nauk;
ALEKSANDROVSKAYA, E.K.

Measuring ground stresses in the foundation of the lock chamber of the Novosibirsk Hydroelectric Power Station. Izv.VNIIG 62:157-163 '59. (MIRA 13:6)

(Foundations)
(Novosibirsk--Locks (Hydraulic engineering))

EYDEL'MAN, Solomon Yakovlevich; NILENDER, Yu.A., prof., doktor tekhn. nauk, retsenzent; KRUKOVSKIY, M.Ya., red.; ZHITNIKOVA, O.S., tekhn.red.

[Actual testing of concrete hydraulic structures] Naturnye issledovaniia betonnykh gidrotekhnicheskikh sooruzhenii. Moskva, Gos.energ.izd-vo, 1960. 209 p. (MIRA 13:7)
(Hydraulic structures--Testing)

EYDEL'MAN, S.Ya., starshiy nauchnyy sotrudnik, kand.tekhn.nauk

Contact stresses in the foundations of concrete hydraulic structures at the Kakhovka hydroelectric development. Izv.VNIIG 63:159-183 '60. (MIRA 14:5)

(Kakhovka--Hydraulic structures) (Foundations)

L [illegible]-67 EWT(m)/EWP(j) WW

ACC NR: AP6032541 (A) SOURCE CODE: UR/0413/66/000/017/0153/0153

INVENTOR: Fomenko, L. A.; Abramov, N. G.; Vasilenko, P. F.; Velikodnyy, V. G.; Demchenko, O. G.; Usenko, V. Ya.; Eydel'man, V. S.

ORG: none

TITLE: Arrangement for packing explosive cartridges. Class 72, No. 185726

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 17, 1966, 153

TOPIC TAGS: packing technique, paper, explosive, packing machinery, cartridge packing

ABSTRACT: An Author Certificate has been issued describing an arrangement for packing explosive cartridges. It consists of a mechanism for unwinding the paper, applying glue and a stencilled pattern on the paper and cutting the paper to specification. There are mechanisms for aligning and collecting the cartridges and shaping bundles, a rotary mechanism, mechanisms for covering packets and unloading prepared packets, and an automatic interlocking system. To increase the efficiency in shaping cartridge packets, the arrangement has a mechanism for shaping packets, made in the form of rectangular flaps hinged with two levers,

UDC: 623.457.621.798.4:622.242

Card 1/2

ACC NR: AP6032541

secured on a coupling rod, and folding during lifting ten cartridges, shaping them into a pcaket in rows of five. To hold the packet of cartridges during packing, the rotary mechanism is equipped with cassettes, containing a frame, a piston with a rod, and clamping levers (see Figs 1 and 2). Orig. art. has: 2 figures. [Translation]

Fig. 1

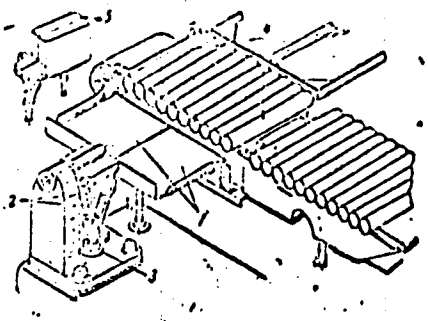


Fig. 2

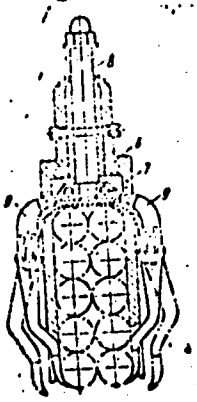


Fig. 1 and 2. Arrangement for packing explosive cartridges.
1--Flaps;
2--levers;
3--coupling rod;
4--ten cartridges;
5--packet of cartridges;
6--body;
7--piston;
8--rod [of piston];
9--levers

SUB CODE: 13/ SUBM DATE: 29Mar65/

EFROS, V.V.; EYDEL'MAN, Ya.L.

Effect of regulated parameters of the fuel system on the performance of D-28 engines. Trakt. i sel'khozmash. no.12:10-12 D '59.
(MIRA 13:3)

(Diesel engines)

EYDEL'MAN, Ya.L., inzh.

Causes of the sticking of needles of the jet sprayers of an engine with a precombustion chamber. Trakt. i sel'khozmash. 33 no.10:16-19 O '63. (MIRA 17:1)

1. Vladimirskiy traktornyy zavod.

L 16066-65 EWT(1)/EWP(e)/EPA(s)-2/EWG(k)/EWT(m)/EPF(c)/EPF(n)-2/EWG(v)/
EPR/EPA(w)-2/EWP(j)/T/EPA(b)/EWA(h) Pz-6/Pu-4/Pt-10/Pu-4 IJP(c)/ESD(t)/AFWL/ASD(a)-5 WW/AT/RM/WH
ACCESSION NR: AP4046457 S/0078/64/009/010/2485/2487

AUTHOR: Gromakov, S. D.; Zoroatskaya, I. V.; Laty*pov, Z. M.; Chvala, M. A.; Eydel'man, Ye. A.; Bady*gina, L. I.

TITLE: Method for investigating phase diagrams of semiconducting systems

SOURCE: Zhurnal neorganicheskoy khimii, v. 9, no. 10, 1964, 2485-2487

TOPIC TAGS: semiconductor, phase diagram, semiconductor system, test apparatus design, solidus temperature, liquidus temperature

ABSTRACT: A method was developed for obtaining thermal data for semiconducting materials which avoids the inherent difficulties of air oxidation, thermal decomposition, and reaction with thermocouple and container materials. The material for thermographic investigation is placed in a quartz ampoule (3-4 mm i. d. 25-30 mm long), sealed under 1-2 mmHg. The thermocouple (fig. 1) made of 3-5 x 12-14 mm platinum foil (a) with soldered platinum rhodium leads (b, c) is arranged so the platinum foil surrounds the ampoule (fig. 1-C). The ampoule is

Card 1/2

L 16066-65
ACCESSION NR: AP4046457

placed in a quartz tube filled with alumina for thermal insulation; and heated in a vertical electric furnace. Using this arrangement, the solidus and liquidus temperatures were obtained for the binary systems PbS-PbSe, PbS-PbTe, CdTe-ZnTe, CdTe-HgTe, and phase diagrams (fig. 2) were constructed. Orig. art has: 4 tables and 3 figures.

ASSOCIATION: Kazanskiy gosudarstvenny*y universitet (Kazansk State University) Penzenskiy pedagogicheskiy institut (Penzensk Pedagogical Institute)

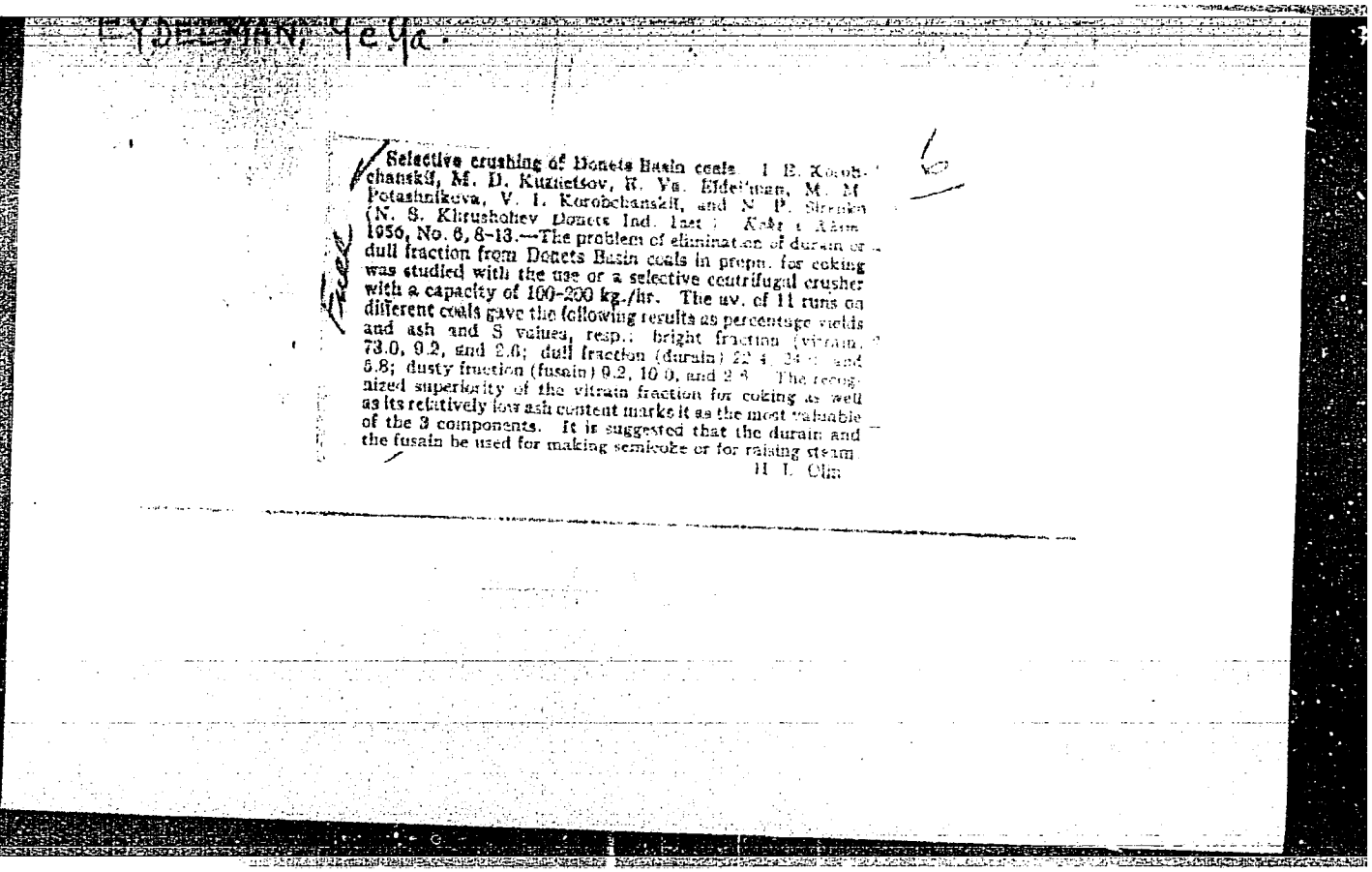
SUBMITTED: 01Feb62 ENCL: 02

SUB CODE: SS NO REF SOV: 001 OTHER: 000

Card 2/4

OSTROVSKIY, E.V.; EYDEL'MAN, Ye.V.; SOKOLOV, A.Ya., doktor tekhn. nauk, prof., retsenzent; ZAYCHIK, TS.R., inzh., retsenzent; BLAGOSKLONOVA, N.Yu., inzh., red.

[Concise handbook for the designer of food machinery] Kratkii spravochnik konstruktora prodovol'stvennykh mashin. Moskva, Mashinostroenie, 1965. 503 p. (MIRA 18:6)



EYDELSHTEYN, Ye.Ya.

Selective crushing of Donets Basin coals. I. E. Korobchanskiĭ, M. D. Kuznetsov, R. Ya. Eidel'man, M. M. Potashnikova, V. I. Korobchanskiĭ, and N. P. Strunkin (N. S. Khrushchev Donets Ind. Inst.). Koks i Khim. 1956, No. 6, 8–13.—The problem of elimination of durain or dull fraction from Donets Basin coals in prepn. for coking was studied with the use of a selective centrifugal crusher with a capacity of 100–200 kg./hr. The av. of 11 runs on different coals gave the following results as percentage yields and ash and S values, resp.: bright fraction (vitrain) 73.0, 9.2, and 2.6; dull fraction (durain) 22.4, 24.[illegible], and 5.8; dusty fraction (fusain) 9.2, 10.0, and 2.8. The recognized superiority of the vitrain fraction for coking as well as its relatively low ash content marks it as the most valuable of the 3 components. It is suggested that the durain and the fusain be used for making semicoke or for raising steam.
H. I. Olim

KUZNETSOV, M.D.; EYDEL'MAN, Ye.Ye.

The quality of coke in connection with grains larger than 6mm contained in a blended coal charge. Koks i khim. no.7:11 '56. (MLRA 9:12)

1. Donetskiy industrial'nyy institut.
(Coke)

EYDEL'MAN, YE. YA.

USSR /Chemical Technology. Chemical Products and Their Application I-15

Treatment of solid mineral fuels

Abs Jour: Referat Zhur - Khimiya, No 9, 1957, 31810

Author : Reznik M.G., Eydel'man Ye. Ya.

Title : Dynamics of Coal Drying

Orig Pub: Khimiya i tekhnol. topliva, 1956, No 7, 36-44

Abstract: By using a laboratory apparatus with a torsion balance a study was made of dynamics of drying of different varieties of coal and anthracite. It is shown that anthracite, long-flame coal and to some extent gas coal are characterized by high values of first critical moisture content (FCM), as a result of which they have a prolonged period of decreasing rate of drying. FCM is minimal in

Card 1/2

USSR /Chemical Technology. Chemical Products and Their Application I-15

Treatment of solid mineral fuels

Abs Jour: Referat Zhur - Khimiya, No 9, 1957, 31812

the case of coal of medium degree of metamorphism. Decrease in particle size causes increased rate of drying, during the first period and increased FCM, the latter inducing increased overall duration of the process, since the major portion of the process takes place under conditions of a decreasing rate of drying. Moisture content coefficients have been determined for coal of grades K and PZh.

Card 2/2

68-1-3/21

AUTHOR: Eydel'man, Ye.Ya., Candidate of Technical Sciences.

TITLE: Size-distribution of the Coal Charge - The Most Important Index of its Quality. (Sitovoy sostav shikhty - vazhneyshiy pokazatel yeye kachestva)

PERIODICAL: Koks i Khimiya, 1957, No. 1, pp. 8 - 10 (USSR)

ABSTRACT: This paper was written as a result of a previously published paper by S.G. Aronov and V.A. Kulasova, Koks i Khimiya, 1955, No.2. The present method of evaluating size-distribution of coal charges by the percentage of less than 3 mm size is criticised. After briefly reviewing Czech work on the size-distribution of crushed coals (Ref. 2) and coal-crushing methods used in Gelenkirchen (Ref. 4), the author proposes to evaluate the size-distribution of coal charges by fractions remaining on 3 mm, 1 mm screens and the fraction 0.2 - 0 mm. There are 3 figures, 1 table and 4 references, of which 2 are Slavic.

ASSOCIATION: Donets Industrial Institute (Donetskiy Industrialnyy Institut)

AVAILABLE: Library of Congress

Card 1/1

SOV/65-58-8-11/14

AUTHORS: Reznik, M. G. and Eydel'man, Ye. Ya.

TITLE: The Effect of the Rate of Heating of Coal on the Course of Separation of Volatile Substances. (Vliyaniye skorosti nagrevaniya uglya na khod vydeleniya letuchikh veshchestv).

PERIODICAL: Khimiya i Tekhnologiya Topliv i Masel, 1958, Nr.8. pp. 56 - 59. (USSR).

ABSTRACT: Investigations were carried out on the effect of the rate of heating Donets gas coal by continuous weighing. 1 g of coal samples in an ampule was heated in a nitrogen current. The variations in weight were observed with the aid of a microscope and a photographic microscale. At the same time the temperature of the coal was registered every 30 seconds (accuracy of temperature measurements = ±0.5°C). The rate of heating varied within the limits of 2 - 60°/minute. Details of a method of investigation and of a plan were described in an earlier article by M. G. Reznik (Ref.1). Some fractions of coal, enriched in their petrographic composition, were also tested. The investigations showed that the micro-components of the group of regular elements are concentrated mainly in the fractions having a specific weight below 1.25 (20 - 30%).

Card 1/3

The Effect of the Rate of Heating of Coals on the Course of Separation of Volatile Substances.

The characteristics of the investigated samples are given in Table 1. Figs. 1 and 2: integral curves showing the dependence of the loss of weight-temperature on the temperature at the start of intensive thermal decomposition of various types of coal. It can be seen that the rate of heating influences the separation of volatile substances. The aforementioned temperature increases with increasing rate of heating, especially in the case of fractions having a specific weight below 1.25. The weight of volatile materials varies considerably with the changing rate of heating. This applies particularly in the range of temperatures between 400°C and 500°C. A comparison of the loss of weight during heating to various temperatures at different rates is given in Table 3. The rate of heating has to be sufficiently high and the final temperature must not exceed the temperature at which disintegration starts. This temperature depends on the petrographic composition of the coal. It was found that after reaching a certain defined temperature (or narrow temperature interval) the

SOV/53-65-8-11/14

The Effect of the Rate of Heating of Coals on the Course of Separation of Volatile Substances.

weight of the separated volatile materials is practically independent of the rate of heating. There are 2 Figures, 5 Tables and 2 Soviet References.

ASSOCIATION: Donetskiy politekhnicheskiy institut. (Donets Polytechnic Institute).

1. Coal gas--Production 2. Coal--Temperature facotrs

Card 3/3

MYDEL'MAN, Ye.Ya.; NOVITSKIY, P.L.; SEMENENKO, G.P.

Heating of coal in an apparatus with a directed flow of the suspended beds of coal. Koks i khim. no.4:13-15 '60. (MIRA 13:6)

1. Donetskiy industrial'nyy institut (for Mydel'man and Novitskiy).
2. Stalinskiy koksokhimicheskiy zavod (for Semenenko)
(Coal preparation)

EYDEL'MAN, Ye.Ya., referent

Maximum load-carrying capacities for coke-oven chamber walls (from "Stahl und Eisen, "nos.7 and 9, 1959). Koks i khim. no.11:62-63 '60.
(MIRA 13:11)

(Germany, West--Coke ovens)

EYDEL'MAN, Ye.Ya., kand.tekhn.nauk

Terminology of the heat engineering of coke ovens. Koks i khim. no.4:62 '61. (MIRA 14:3)

1. Donetskiy politekhnicheskiy institut.
(Coal—Carbonization)

EYDEL'MAN, Ye.Ya.

Simplified methods of computing heat engineering calculations for determining the heat efficiency of coke ovens. Koks i khim. no.1:27-29 '62. (MIRA 15:2)

1. Konetskiy politekhnicheskiy institut.
(Coke ovens)

EYDEL'MAN, Ye.Ya.

Books on coal chemistry. Koks i khim. no.4:61-63 '62.
(MIRA 16:8)

1. Donetskiy politekhnicheskiy institut.
(Bibliography--Coal--Analysis)

REZNIK, M.G., kand. tekhn. nauk; EYDEL'MAN, Ye.Ya., kand. tekhn. nauk

Study of low-temperature oxidation of coals. Sbor. DonUGI no.25:96-121 '62. (MIRA 16:6)

(Coal) (Oxidation)

EYDEL'MAN, Ye.Ya.

Discussion of the article "Thermal processing and predrying of coal" by P.I.Turchenko, P.E.Messerle, A.V.Ostapchenko. Koks i khim. no.3: 63-64 '63. (MIRA 16:3)
(Coke) (Coal preparation) (Turchenko, P.I.) (Messerle, P.E.) (Ostapchenko, A.V.)

KUZNETSOV, M.D.; EYDEL'MAN, Ye.Ya.; ADLER, Yu.P.; FRENKEL', A.A.

Useful book for the chemical engineers of the coke industry.
Koks i khim. no.3:61-64 '64. (MIRA 17:4)

1. Donetskiy politekhnicheskiy institut (for Kuznetsov, Eydel'man).
2. Gosudarstvennyy nauchno-issledovatel'skiy proyektnyy institut redkometallicheskoy promyshlennosti, Moskva (for Adler, Frenkel').

EYDEL'MAN, Yu.

Impregnating wood for electric line poles. Sel'. stroi. 16 no.10:14-15 O '61. (MIRA 14:11)

1. Glavnyy inzhener Stavropol'skogo stroitel'no-montazhnogo tresta Sel'elektrostroy.
(Stavropol Territory--Wood--Preservation)
(Electric lines--Poles)

EYDEL'MAN, Z.M.; SAPOZHNIKOV, D.I.; BAZHANOVA, N.V.; POPOVA, O.F.

Comparative study of the effect of photosynthetic poisons on photochemical conversion of some xanthophylls. Fiziol. rast 7 no.2:129-132 '60. (MIRA 14:5)

1. Komarov Botanical Institute, U.S.S.R Academy of Sciences, Leningrad.

(Xanthophylls)
(Photosynthesis)
(Phosphorylation)

SAPOZHNIKOV, D.I.; ALKHAZOV, D.G.; EYDEL'MAN, Z.M.; BAZHANOVA, N.V.; LEMBERG, I.Kh.; MASLOVA, T.G.; GIRSHIN, A.B.; POPOVA, I.A.; SAAKOV, V.S.; POPOVA, O.F.; SHIRYAYEVA, G.A.

Incorporation of O^{18} from heavy oxygen water into violaxanthin due to the action of light on plants. Bot. zhur. 46 no. 5:673-676 My '61. (MIRA 14:7)

1. Botanicheskiy institut imeni V.L. Komarova AN SSSR, Leningrad.
(Oxygen—Isotopes) (Violaxanthin)

SAPOZHNIKOV, D.I.; EYDEL'MAN, Z.M.; BAZHANOVA, N.V.; MASLOVA, T.G.; POPOVA, O.F.

Concerning the participation of carotenoids in the process of photosynthesis. Trudy Bot. inst. Ser. 4 no.15:43-52 '62. (MIRA 15:7)

(Photosynthesis) (Carotenoids)

EYDEL'MAN, Z.M.; SAPOZHNIKOV, D.I.; BAZHANOVA, N.V.; MASLOVA, T.G.; POPOVA, O.F.; SHIRYAYEVA, G.A.

Relation between phosphorylation reactions and the transformation of xanthophylls in the course of photosynthesis. Trudy Bot. inst. Ser. 4 no.15:224-233 '62. (MIRA 15:7)
(Xanthophyll) (Photosynthesis) (Phosphorylation)

SAPOZHNIKOV, D.I.; EYDEL'MAN, Z.M.; TOLIBEKOV, D.; KHODZHAYEV, A.

Transformation of xanthophylls in partially reconstructed systems. Bot.zhur. 47 no.11:1656-1659 N '62. (MIRA 16:1)

1. Botanicheskiy institut imeni V.L.Komarova AN SSSR, Leningrad.
(Photosynthesis) (Xanthophylls)

EYDEL'MAN, Z.M. (Leningrad)

Photosynthetic phosphorylation and its relation to other photosynthetic reactions. Usp. soor. biol. 53 no.1:54-68 '62. (MIRA 15:5)
(PHOTOSYNTHESIS) (PHOSPHORYLATION)

EYDEL'MAN, Z.M.; POPOVA, O.F.; SHIRYAYEVA, G.A.; CHERNYAYEVA, I.I.

Effect of the inhibitors of the photochemical reaction of xanthophyll interconversion on the process of photosynthetic phosphorylation. Trudy Bot. inst. Ser 4 no.16:142-153 '63. (MIRA 17:2)

EYDEL'MAN, Z.M.; KHODZHAYEV, A.S.

Dynamics of the photoreaction of mutual transformations of xanthophylls in the process of virescence. Dokl. AN SSSR 150 no.4:928-930 Je '63. (MIRA 16:6)

1. Botanicheskiy institut imeni V.L. Komarova AN SSSR. Predstavleno akademikom A.L. Kursanovym.
(Xanthophyll) (Photosynthesis)

SAPOZHNIKOV, D.I.; EYDEL'MAN, Z.M.; BAZHANOVA, N.V.; MASLOVA, T.G.; POPOVA, O.F.; SHIRYAYEVA, G.A.

Characteristics of the light reaction of xanthophyll conversion under conditions of anaerobiosis. Bot.zhur. 49 no.10:1463-1465 O '64. (MIRA 18:1)

1. Botanicheskiy institut imeni V.L.Komarova AN SSSR, Leningrad.

ACCESSION NR: AP4012981 S/0020/64/154/004/0974/0977

AUTHORS: Sapozhnikov, D.I.; Alkhazov, D.G.; Rydel'man, Z.M.; Bazhanova, N.V.; Lemberg, I. Kh.; Maslova, T.G.; Girshin, A.B.; Popova, I.A.; Saakov, V.S.; Popova, O.F.;

TITLE: Participation of xanthophylls in oxygen transport during photosynthesis

SOURCE: AN SSSR. Doklady*, v. 154, no. 4, 1964, 974-977

TOPIC TAGS: xanthophyll, oxygen transport, photosynthesis, labeled oxygen green algae, chlorella species, O sup 18 determination, lutein, carotene, chlorophyll, chromatography, F sup 18

ABSTRACT: Labeled oxygen was used in a suspension of unicellular green algae species chlorella pyrenoidosa to study transformation reactions of violaxanthin and lutein. In addition, other pigment fractions were investigated under the influence of light. The H_2O^{18} suspension, enriched with C^{18} (68%), was exposed for 30 min-

Card 1/3

ACCESSION NR: AP4012981

utes to the light source. Chromatographic determinations of 4 pigment zones, carotene with colorless lipids, chlorophylls (masking neoxanthin), lutein and violaxanthin were made. These were then eluted and concentrated, followed by transformation of O^{18} into the radioactive isotope F^{18}, using cyclotron and 4 Mev proton irradiation of a film of each pigment fraction on a tantalum disk. The (figured) activities of the various pigments were calculated per 100μg of substance and a 46 microcoulomb charge carried by the protons during 4 hours following irradiation, excluding the cosmic-ray background. Standard error was at most 5%. All fractions with the exception of lutein were strongly labeled following exposure to the light, and the latter indicated the absence of O participation in the OH groups at the lutein rings. It was concluded that an exchange occured between the epoxy oxygen of violaxanthin and the O^{18} in the water, thus confirming participation of the xanthophylls in oxygen transport during photosynthesis. O^{18} also enters the lipid fractions of carotene and the composition of the substances accompanying the chlorophylls in the chromatogram. Orig. art. has:

Card 2/3

ACCESSION NR: AP4012981

3 figures.

ASSOCIATION: Botanicheskiy institut im. V.L. Komarova Akademii nauk SSSR (Botanical Institute, Academy of Sciences SSSR)

SUBMITTED: 28Mar63 DATE ACQ: 26Feb64 ENCL: 00

SUB CODE: CH NO REF SOV: 013 OTHER: 003

Card 3/3

EYDEL'MAN, Z.M.; KHODZHAYEV, A.S.

Effect of intermittent illumination on the interconversion of xanthophylls in green etiolated shoots. Dokl. AN SSSR 158 no.1:242-244 S-O '64 (MIRA 17:8)

1. Botanicheskiy institut imeni V.L. Komarova AN SSSR. Predstavleno akademikom A.L.Kursanovym.

EYDEL'NANT, A.S.

Effect of green manuring on soil fertility and the biological processes in a young fruit garden. Uzb. biol. zhur. 8 no.6: 43-48 '64. (MIRA 18:3)

1. Nauchno-issledovatel'skiy institut sadovodstva, vinogradarstva i vinodeliya imeni Shredera.